Earth's Atmosphere and Weather

6-4 The student will demonstrate an understanding of the relationship between Earth's atmospheric properties and processes and its weather and climate. (Earth Science)

6.4.3 Classify shapes and types of clouds according to elevation and their associated weather conditions and patterns.
Taxonomy level: 2.3-A, B Understand Conceptual Knowledge

Previous/Future knowledge: In 4th grade (4-4.2), students classified clouds according to their three basic types (cumulus, cirrus, and stratus) and summarized how clouds form.

It is essential for students to know that clouds that form from the condensation of water vapor are classified by a basic shape and associated weather conditions and patterns. Clouds can be classified in three major groups:

Cumulus
- Clouds formed at medium or low elevation.
- Cumulus clouds are puffy with flat bottoms.
- When cumulus clouds are white they often signal fair weather, but when they are darker, they may signal rain or thunderstorms.

Cirrus
- Clouds formed at high elevations; wispy clouds usually consisting of ice crystals that signal fair weather or may also signal an approaching warm front.

Stratus
- Clouds formed at medium or low elevation; spread out layer upon layer covering a large area
- As stratus clouds thicken, precipitation usually occurs over that area.

It is essential for students to know the names of many clouds are a combination of one of the three basic shapes and a prefix or suffix. The basic shape name can be combined with the appropriate prefix or suffix listed below as clues to the weather conditions that may result.
- Combinations of those shapes can be used with *nimbus,* which means "rain", for example, cumulonimbus or nimbostratus.
- A *cumulonimbus* cloud, also called a thunderhead, is often part of thunderstorm conditions that may accompany a cold front.
- The prefix *alto-* may also be used to indicate medium-level clouds formed at about 2-6 kilometers up into the atmosphere, for example, altocumulus or altostratus.

Clouds that form when condensation occurs at or near the ground are called *fog*.

It is not essential for students to know the details of cloud formation, condensation nuclei and dew point. Knowing the numerous combinations of cloud names is also not essential.

Assessment Guidelines:
The objective of this indicator is to *classify* shapes and types of clouds according to elevation and their associated weather conditions and patterns; therefore, the primary focus of assessment should be to determine the cloud category based on the description. However, appropriate assessments should also require students to *recognize* a cloud type based on a description;

illustrate cloud shapes or types through pictures or words; or *compare* weather conditions associated with cloud types.